hand, there is a desire to improve the charge efficiency to the power storing means 40 and effectively utilize the power stored on the storage means 50, due to a desire for increasing the operating time of the electronic portable appliance.--

Please replace the paragraph beginning at page 2, line 14, with the following rewritten paragraph:

--In the related art electronic portable appliance, rectification is made by the diode element 601 in order to prevent the stored power from reversely flowing in the event that the generation power runs out. However, the major cause of lowering the charge efficiency lies in loss due to a forward voltage drop across the diode element 601. Accordingly, the use of a diode element with a low forward voltage drop improves the charge efficiency. Meanwhile, the major cause of preventing effective utilization of the power stored on the power storing means 40 is current loss due to reverse current through the diode element 601. That is, it is satisfactory to use such a diode element that is low in forward voltage drop but less in reverse current. However, for the diode element, decrease in forward voltage drop and reduction in reverse current are in relationship of trade off. That is, there has been a problem that it is impossible to realize an electronic portable appliance smaller in size and lighter in weight and operable over a longer time so long as a diode element is used in the above-stated portion.--

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Please replace the paragraph beginning at page 3, line 12, with the following rewritten paragraph:

--An electronic portable appliance of the present invention to be driven on generation power is configured by a power feed means formed by only a power generating means or a combination of a power generating means and a booster means, a power storing means for storing power of the power feed means, a drive circuit to be operated on power of the power feed means or power stored on the power storing means, a switch means provided on a charging path for charging power of the power feed means to the power storing means to have a function of flowing a charge current and cutting off a reverse current and a feature of having a resistor component to produce a potential difference in the event a current flow, a voltage comparator circuit for comparing voltages on between a charging path point forward of the switch means and a charging path point backward of the switch means, and a control circuit for controlling the switch means depending on a result of comparison by the voltage comparator circuit.--

Please replace the paragraph beginning at page 4, line 2, with the following rewritten paragraph:

--As discussed before, the resistance component possessed by the switch means produces a potential difference

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at respective ends of the switch means during charging or current reverse flow. It it therefore possible for the voltage comparator circuit in the control circuit to perform stable voltage comparison. Thus, realized is a control circuit capable of stably controlling the switch means.--

Please replace the paragraph beginning at page 4, line 9, with the following rewritten paragraph:

--Accordingly, the switch means and control circuit can realize an equivalent function to the diode element used in the conventional electronic portable appliance. In the case of large charge current, the switch means decreases the efficiency of charging to a degree corresponding to the resistance component due to voltage drop through the resistance component. Where the charge current is low, there is almost no decrease of charge current due to voltage drop through the resistance component. Moreover, reverse current is suppressed extremely low. Accordingly, where only a certain degree of charge current occurs, it is possible to improve the charge efficiency and decrease the reverse current.--

Please replace the paragraph beginning at page 5, line 8, with the following rewritten paragraph:

--Furthermore, the invention in the above configuration is structured that a diode element is provided in series with the switch means in place of using the resistor element wherein the diode has a lower forward voltage drop than that of the diode used in the conventional electronic portable appliance.--

Please replace the paragraph beginning at page 5, line 13, with the following rewritten paragraph:

--Due to this, the diode element, in place of the resistor element, can produce a potential difference during charging or reverse current flow. Thus, realized is a control circuit to stably control the switch means, as discussed above. Moreover, the usability of a lower forward voltage drop of a diode element than that of the diode element used in the conventional electronic portable appliance improves the charging efficiency. Moreover, the switch element can cut off reverse current, hence reducing the reverse current. Furthermore, for large charge current the diode element is lower in voltage drop in a charging direction as compared to the resistor element. In such a case, the charging efficiency increases as compared to the structure using the resistor element.--

Please replace the paragraph beginning at page 8, line 11, with the following rewritten paragraph:

--The power feed means 10 does not necessarily require the booster circuit 12 provided that the power generating means 11 can generate an electromotive force higher than an operation voltage of drive circuit 50 during most part of power generation. However, if not so the booster circuit 12 has to be provided. It is noted that the power generating means may be any of a scheme utilizing a coil self-induction, a solar battery cell, a thermoelectric conversion device and piezoelectric effect, or a combination of these power generating schemes. Meanwhile, the booster circuit may be any of a switched capacitor scheme, a charge pump scheme, a scheme of rectifying and outputting alternating current amplified by a transformer and a scheme of rectifying and outputting alternating current amplified by piezoelectric element resonance, or a combination of these schemes.--

Please replace the paragraph beginning at page 8, line 25, with the following rewritten paragraph:

On the other hand, the switch means 20 is provided on a power charge path for charging the power of the power feed means 10 to the power storing means 40. The control circuit 30 incorporates therein a voltage comparator circuit

to compare between a terminal voltage of the switch means 20 on the side of a power feed means 10 output terminal and terminal voltage thereof on the side of the power storing means 40. When this voltage comparator circuit detects that the terminal voltage of the switch means 20 on the power feed means is higher than the terminal voltage on the power storing means 40, the switch means 20 is tuned on to supply the power of the power feed means 10 to the power storing means 40 or the drive circuit 50. In other cases, the switch means 20 is turned off to prevent the power stored on the power storing means 40 from reversely flowing to the power feed means 10. Due to this, it is possible to realize a rectification function by the use of the switch means 20 that has conventionally been realizable only by a diode element. The switch means 20 is lower in voltage drop caused due to passing charge current as compared to that of a diode element, thus eliminating almost all the charge loss due to voltage drop. That is, the use of the switch means 20 instead of a diode element drastically improves charge efficiency. Furthermore, the switch means 20 is extremely low in the reverse current to be caused during off periods, i.e., corresponding to a reverse current through a diode element, as compared to a diode element. That is, there is almost no consumption of useless power in the form of reverse current. Consequently, it is

A9 cont

possible to realize further longer time operation for an electronic portable appliance operating on generation power. Because less generation power is required for a same operation time as the conventional, the power generating means can be reduced in size and weight. Due to this, the electronic portable appliance can be reduced in size and weight.--

Please replace the paragraph beginning at page 10, line 12, with the following rewritten paragraph:

A10

--Incidentally, Fig. 1 shows the case that the switch means 20 utilizes a P channel MOS transistor. As shown in Fig. 1, the P channel MOS transistor has a source and substrate connected to the power storing means 40, a drain connected to the power feed means 10, and a gate connected to receive a control signal from the control circuit 30.--

Please replace the paragraph beginning at page 10, line 18, with the following rewritten paragraph:

A11

--Furthermore, the switch means 20 has a resistance component to provide a voltage drop of approximately 20 mV, due to a current cause when charging the power of the power feed means 10 to the power storing means 40 or when the storage power on the power storing means 40 reversely flows to the power feed means 10. Due to this, even where the voltage

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comparator circuit of the control circuit 30 has an offset voltage to be encountered as an unavoidable problem with a voltage comparator circuit, the 20 mV voltage drop by the resistance component can absorb such offset voltage.--

Please replace the paragraph beginning at page 12, line 5, with the following rewritten paragraph:

A12

--Due to this, a best resistance value can be set for stably operating the control circuit 30 in accordance with the ability of the power feed means 10 by replacing with the resistor element 201, in addition to the effect offered by the electronic portable appliance 100 of Embodiment 1 shown in Fig. 1. Thus, there obtains an effect that time and labor can be omitted in designing a switch means 20 having a best resistance component for stably operating the control circuit 30 in accordance with the ability of the power feed means 10 or searching for a switch means 20 having a close resistance value to a best resistance value.--

Please replace the paragraph beginning at page 13, line 6, with the following rewritten paragraph:

A13

--Here, the diode element 301 adopts a diode element having a forward voltage drop by far lower than that of a diode element used in the conventional electronic portable

A13 Cont

appliance driven on generation power. This can suppress low a voltage drop on a charging path from the power feed means 10 to the power storing means 40 and hence improve charge efficiency, as compared to the conventional electronic portable appliance driven on generation power. Of course, the adoption of the diode element with such low forward voltage drop increases reverse current through the diode element. However, such reverse current when flowing can be put off by the switch means 20. Thus, reverse current can be suppressed by far low.--

Please replace the paragraph beginning at page 13, line 18, with the following rewritten paragraph:

A14

--Furthermore, the diode element 301 has the function of producing a voltage drop to be provided by the resistance component of the switch means 20 of the electronic portable appliance shown in Fig. 1 or by the resistor element 201 of the electronic portable appliance shown in Fig. 2, thereby providing an effect of stably operating the control circuit 30. Furthermore, for high charge current, provided is an effect of improving the charge efficiency. This is because the voltage drop due to a resistance component caused upon passing the resistance component by a charge current linearly increases with increase in the charge current. On the other

hand, for low charging current the voltage drop due to a diode element is greater by an amount of a forward voltage drop than a voltage drop due to a resistance component. For high charging current, that voltage drop is lower than a voltage drop due to the resistance component. That is, in the case of high charging current, the utilization of a diode element provides higher charging efficiency than the use of resistance component.--

Please replace the paragraph beginning at page 14, line 9, with the following rewritten paragraph:

--Incidentally, in Fig. 3 the points to be compared of voltage by the voltage comparator circuit of the control means 30 may be anywhere provided that they are positioned on a charging path at forward and rear points of the diode element 301 and switch means 20. Furthermore, the diode element 301 and the switch means 20 may be provided anywhere on the charging path.--

Please replace the paragraph beginning at page 14, line 21, with the following rewritten paragraph:

--This structure realizes an electronic portable appliance possessing both the effect given by the structure shown in Fig. 2 and the effect by the structure of Fig. 3.

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That is, for low charge current nearly all the charge current is supplied through the resistor element 201. For high charge current almost all the charge current is supplied through the diode element 301. Due to this reason, in both the low and high charge current cases, it is possible to decrease the voltage drop upon charging thus offering efficient charging.

Please replace the paragraph beginning at page 15, line 4, with the following rewritten paragraph:

A17

--Incidentally, in Fig. 4 the points to be compared of voltage by the voltage comparator circuit of the control means 30 may be anywhere provided that they are located on a charging path at forward and rear points of the diode element 301 and resistor element 201 connected in parallel therewith. Furthermore, the diode element 301 and the resistor element 201 connected in parallel therewith or the switch means 20 may be anywhere on the charging path.--

Please replace the paragraph beginning at page 15, line 11, with the following rewritten paragraph:

A18

--Referring to Fig. 5, there is shown a schematic block diagram of a control circuit 30 to be used in the electronic portable appliance for Embodiments 1 to 4 shown in Fig. 1 to Fig. 4. As shown in Fig. 5, a first input terminal

502 is connected to a charging path on a front stage of means for causing a voltage drop due to a charge current or to a charging path on a front stage of a switch means 20. A second input terminal 503 is connected to a charging path on a rear stage of the means for causing a voltage drop due to a charge current or to a charging path on a rear stage of the switch means 20. Furthermore, a GND connection terminal 504 is connected to a GND terminal. Also, a control circuit 30 is provided with an output terminal 501 to output a control signal to turn on and off the switch means.--

Please replace the paragraph beginning at page 15, line 24, with the following rewritten paragraph:

--The input power voltage to the first input terminal 502 is divided by a first bleeder resistor formed by a resistor 507 and a resistor 508. The input power voltage to the second input terminal 503 is divided by a second bleeder resistor formed by a resistor 509 and a resistor 510. A voltage comparator circuit 506 compares a voltage divided by the first bleeder resistor with a voltage divided by a second bleeder resistor, and outputs a comparison result to a memory circuit 505. Furthermore, a switch means 511 is provided between the first bleeder resistor and the GND terminal. A switch means 513 is provided between the second bleeder

resistor and the GND terminal. A switch means 512 is provided between the voltage comparator circuit 506 and the GND terminal. Each switch means 511, 512, 513 is intermittently turned on by an intermittent signal outputted by an intermittent pulse generating circuit 516. Also, the memory circuit 505 receives such an intermittent pulse to acknowledge timing of turning on the switch means 511, 512, 513, and rememorize a result of comparison by the voltage comparator circuit 506 each time the switch means 511, 512, 513 turns on. The comparison result memorized by the memory circuit 505 is outputted to the output terminal 501, as a signal to control the switch means 20 shown in Fig. 1 to Fig. 4. Furthermore, the intermittent pulse generating circuit 516 creates an intermittent pulse based on a frequency divided signal divided of a clock signal of an oscillation circuit 514 by the frequency dividing circuit 515. It is noted that here the ratio of the resistor 507 to the resistor 508 is taken the same as the ratio of the resistor 509 to the resistor 510, in order to enhance highest the accuracy of comparison by the voltage comparator circuit 506.--

IN THE CLAIMS:

Kindly amend claims 1-5 and 9-11 by rewriting them in amended form as follows: